

## Oribatids from Switzerland VIII (Acari: Oribatida: Ptyctima). (*Acarologica Genavensis CII*)

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**Oribatids from Switzerland VIII (Acari: Oribatida: Ptyctima).  
(*Acarologica Genavensis CII*).** - Earlier published and newly determined Swiss moss mites belonging to the "ptychoid" groups are listed, discussed or described. From the 20 named species in the literature 10 are confirmed after critical discussion. New identifications of a total of 42 taxa are given, 3 of which (*Phthiracarus besuchetianus* sp. n., *Steganacarus (S.) antennatus* sp. n. and *Steganacarus (S.) schweizeri* sp. n.) are new to science and 30 new for the Fauna of Switzerland. Some new or additional morphological data as well as some notes on the taxonomy and distribution of this group are given.

**Key-words:** Acari - Oribatida - Ptyctima - taxonomy - new species - Switzerland.

### INTRODUCTION

The present paper, the 8th part of the series (concerning our project, started in July 1983 see Mahunka & Mahunka-Papp, 2001), proposes to discuss our results gained on the ptychoid groups of the Swiss Fauna comprising the already published references and our recent results.

New identifications of 42 species and subspecies belonging to the families Phthiracaridae, Steganacaridae, Euphthiracaridae, Oribotritiidae and Mesoplophoridae, found on the territory of Switzerland, are given. Among them 3 are new for science and 30 are new for the Fauna of Switzerland. Some rare species are recorded and the locality data for all our identifications are given. Morphological details, corrections and the interpretation of some species are also given.

Unfortunately, the early data are mostly uncertain because there is perhaps no other oribatid group in recent decades which has suffered so many changes than this one due to the arduous work of Parry/Kamill (Parry, 1979; Kamill & Baker, 1980; Kamill, 1981), Niedbała (Niedbała, 1986a; Niedbała, 1986b; Niedbała, 1992) Bernini (e.g. Bernini & Avanzati, 1986) and others (see Balogh & Mahunka, 1983; Balogh & Balogh, 1992). The 20 named species (under the same name different authors understand different species) known from the earlier literature are critically discussed, the existing slides partly revised and 10 of them accepted as members of the Swiss Fauna.

This contribution follows the system of Niedbała (1986a, 1992) with some slight modifications, also the terminology of the morphological descriptions is modified as in our previous papers (e.g. Mahunka, 1990). Contrary to our earlier practice we introduce a significant change in systematics, i.e. the abandonment of the subgenus *Archiphthiracarus* Balogh & Mahunka, 1979, heretofore retained for practical purposes. Since there is not a single species of the “*Archiphthiracarus*” group (5 pairs of anoadanal setae) known in which a complete reduction of two pairs of the adanal setae could be observed (there are always 1-2 partially vestigial pairs of setae), we see no reason to conserve this subgenus. Presently the species *P. globosus* (C. L. Koch, 1841) displays both variations, consequently, the concept of Niedbała (1992) should be followed.

## HITHERTO PUBLISHED SPECIES OF SWISS PTYCTIMA

### HISTORY

This group has been studied and results published by Schweizer (1922, 1948, 1956), Borcard (1988, 1991) and Mahunka (1993a, 1993b).

The following chronological list recapitulates all recorded species with the published name and the actual valid name or, in the case of misidentifications, the correct species.

### SCHWEIZER, 1922

*Hoploderma magnum* (Nic.) = *Steganacarus magnus* (Nicolet, 1855)

*Hoploderma dasypus* (Ant. Dugès) = species inquirenda

*Hoploderma globosum* (C. L. Koch) = *Phthiracarus globosus* (C. L. Koch, 1841)

*Hoploderma striculum* (C. L. Koch) = *Atropacarus striculus* (C. L. Koch, 1835)

*Phthiracarus arduus* (C. L. Koch) = *Rhysotritia ardua* (C. L. Koch, 1841)

### SCHWEIZER, 1948

*Hoploderma laevigatum* (C. L. Koch) = ?

*Hoploderma spinosum* (Sellnick) = ?

*Hoploderma magnum* (Nic.) = *Steganacarus magnus* (Nicolet, 1855)

*Phthiracarus pavidus* (Berl.) = ?

*Phthiracarus piger* (Scopoli) = species inquirenda

*Phthiracarus globosus* (C. L. Koch)

### SCHWEIZER, 1956

*Phthiracarus borealis* (Trhgd.) = ?

*Phthiracarus crenophilus* Willmann, 1951

*Hoploderma laevigatum* (C. L. Koch) = ?

*Hoploderma spinosum* (Sellnick) = *Steganacarus antennatus* sp. n.

*Hoploderma striculum* (C. L. Koch) = *Atropacarus striculus* (C. L. Koch, 1835)

*Hoploderma pavidum* Berlese, 1913 = ?

*Hoploderma clavigerum* Berlese, 1903 = ?

*Oribotrita* [sic!] *nuda* (Berlese) = *Mesotritia nuda* (Berlese, 1887)

*Oribotrita* [sic!] *canestrinii* Berlese [sic!] = *Rhysotritia ardua* (C. L. Koch, 1841)

### BORCARD, 1991

*Hoplophthiracarus pavidus* (Berlese) 1913 = ? *Hoplophthiracarus vanderhammeni* Niedbała, 1991

*Phthiracarus cf. tardus* Forsslund 1956 = *Phthiracarus cf. longulus* (C. L. Koch, 1841)

*Phthiracarus* sp. A = ?

*Phthiracarus* sp. B = ?

*Phthiracarus* sp. C = ?

*Steganacarus herculaneus* Willmann, 1951

*Steganacarus striculus* (C. L. Koch) 1836 = *Atropacarus striculus* (C. L. Koch, 1835)

*Rhysotritia ardua* (C. L. Koch) 1841

MAHUNKA, 1993a

*Helvetacarus genavensis* Mahunka, 1993

MAHUNKA, 1993b

*Rhysotritia a. ardua* C. L. Koch, 1841

*Atropacarus wandae* Niedbała, 1981

*Phthiracarus (Archiphthiracarus) bryobius* Jacot, 1930 = *Phthiracarus bryobius* Jacot, 1930

*Phthiracarus (Phthiracarus) globosus* (C. L. Koch, 1841) = *Phthiracarus globosus* (C. L. Koch, 1841)

## CRITICAL CONSIDERATIONS

### GENERAL REMARKS ON SCHWEIZER'S PUBLICATIONS

It was Schweizer who published the most numerous data on ptychoid groups similarly to other superfamilies. A significant part of the species mentioned by him could be studied due to the help of the late custodian of the Naturhistorisches Museum Basel, Dr C. Bader, our good friend (see also Bader, 1969). Unfortunately, the material is in poor condition, which is partly due to the permanent slides (which, for obvious reasons, could not be remounted), and partly to the fact that some of the slides suffered heavy damage, so could not be studied at all, and also because Schweizer – out of necessity – amassed sometimes 10–20 specimens on a single slide. These slides occasionally include specimens belonging to 5–6 genera, which he obviously knew. Furthermore, he also committed mistakes in the grouping of specimens, at the species or even at the generic level, in such cases the specimens of 2–3 different *Phthiracarus* species are found side by side and, to further aggravate the problem, under one species name.

So partly for these and some other reasons we could not study all his available slides, so his identifications in the collection need further, thorough investigation.

Schweizer listed a total of 14 “ptychoid” species in his works. On the basis of his drawings and slides this number is reduced to six as belonging to the fauna of Switzerland. Quite obviously he understood different species under other names. We accept the following six species of Schweizer to be members of the Swiss Fauna:

*Phthiracarus crenophilus* Willmann, 1951

*Phthiracarus globosus* (C. L. Koch, 1841)

*Steganacarus magnus* (Nicolet, 1855)

*Atropacarus striculus* (C. L. Koch, 1835)

*Rhysotritia ardua* (C. L. Koch, 1841)

*Mesotritia nuda* (Berlese, 1887)

### SCHWEIZER, 1922

In his first work he mentioned five species, which had been identified most likely by using the work of Michael (1898). However, no voucher specimens have been

found in the collection of the Naturhistorisches Museum, Basel. In all probability, from among the five species *Hoploderma magnum*, *Hoploderma globosum*, *Hoploderma striculum* and *Phthiracarus arduus* were correctly determined, although *H. magnum* was interpreted in his subsequent works as a *Phthiracarus* species. In the case of *H. dasypus* it is best to accept the standpoint of Niedbała (1992), i.e. the status of the species is wholly uncertain, so the identification of Schweizer cannot be evaluated at all.

Generally Schweizer has not made reference to his earlier data, so he makes no reference to his identifications of 1922 in his subsequent papers of 1948 or 1956. Indeed he makes no particular reference to his species listed in 1948 in his paper published in 1956, although it appears quite obvious that he has these 1948 species in mind. Part of the recovered slides also supports this suggestion.

#### SCHWEIZER, 1948

This work listed six species. However, only two species (*H. magnum*, *H. globosum*) were mentioned in 1922, but three (*H. laevigatum*, *H. spinosum* and *H. pavidum*) are repeated in 1956. Oddly he does not mention the species *H. magnum*, *Phthiracarus piger* and *P. globosus* in 1956.

Of the three species *H. magnum* and *P. globosus* may be accepted as good identifications, however, *P. piger* Scopoli, 1763 is a species inquirenda as is the already mentioned *P. dasypus* (see Niedbała, 1992: 3). In connection with this species we cannot accept the view of Berg *et al.* (1990) that it is *P. piger*, because the neotypes were designated by van der Hammen (1963, 1964) upon the redescription of *P. laevigatus* and *P. nitens* (= *P. piger* sensu Berg *et al.*, 1990) (which was not made in the work of Berg *et al.*, 1990). Consequently, the rule of the ICZN should be applied, according to which the name of the first specialist (§ 24) revising the name should be used.

We have not found a single specimen of the species *H. globosus*. The material of *P. piger* which we had received contained only slides: N 786 ("Mtr. Pr. 1, 13. VII. 30, V. d. Botsch, 2100 m. Wurzelgef.")<sup>1</sup>, N 1426 and N 1427 ("No. 8, Scarl, Lawiner, 12. VII. 1932, v. Holz"). The species name of *piger* on all three slides was crossed out, most likely by Schweizer himself: One slide bears the name *borealis*, the other two *crenophilus*, displaying identical hand-writing as for the generic name. We have established that the slide bearing *borealis* includes specimens of the species *P. bryobius* Jacot, 1930, while the other two bearing the name *P. crenophilus* Willmann, 1951 had been correctly identified.

#### SCHWEIZER, 1956

The species of *Hoploderma pavidum* (Berlese, 1913) was misunderstood by Schweizer. The slides (N 668, N 1288 and N 1745) said to contain these specimens, in fact, display a so far unidentified *Steganacarus* species. Consequently, *H. pavidum* as referred to by Schweizer should be deleted from the fauna of Switzerland.

<sup>1</sup> Orthography is reported just as on the labels of the slides.

We have also found the slide N 583 ("Mtr. Pr. 6, 20. VII. 29, Val Cluozza, Valetta, Bachmoos 1900 m.") containing the species *Hoploderma laevigatum* as listed and figured by Schweizer. In fact, it has nothing to do with *P. laevigatum* itself. Quite unequivocally it may be stated again that it is an unidentified *Steganacarus* species. On this very same slide were also embedded the species *P. spadix* Niedbała, 1983 and another *Phthiracarus* species. So *P. laevigatus* should also be deleted from the fauna list of Switzerland, and this applies for the previous publications too.

The species *Hoploderma striculum* (C.L. Koch, 1835) was recorded by Schweizer several times (1922, 1956). We have found it on a number of slides, as for example N 1267, 1268 and 1274 ("Mtr. Pr. XII, Punt Perif, 23. VII. 1930, Moos, Wasser-Kante d. Spöl."), and the well-preserved specimens confirm a correct identification.

We have found several specimens of the species *Hoploderma clavigerum* as identified by Schweizer on slides N 1819 and N 1820 ("Mtr. Pr. XV, Scarl, 2000 m, 24. VII. 1932, in Mull von Bergföhren-Nadeln, Sammelpräparat"), so it is certain that the species had been identified by Schweizer on the basis of these specimens. However, they belong to a so far undescribed *Steganacarus* species, since the chaetotaxy of leg IV is clearly discernible. This species again should be deleted from the list of the Swiss fauna.

The Schweizer identified *Hoploderma spinosum* has also been recovered in the collection. This species is however a new one which is described in this contribution in the *Steganacarus* genus (*S. antennatus* sp. n.). *S. spinosus* (Sellnick, 1920) should also be deleted from the Swiss fauna list.

In his work of 1956 Schweizer also identified two *Oribotrita* [sic!] species. *Oribotritia* (= *Mesotritia*) *nuda* (Berlese, 1887) was represented only on one slide (N 891) with the following data: "N 53, 17. VII. 1930 Stavel-chod, 2100, u. Holz". Although the examined specimen is well preserved, without remounting a true identification is impossible, for many significant features cannot be studied. Nevertheless, we consider the identification to be correct.

The specimens referring to the species of *Oribotritia canestrinii* (Michael, 1898) were located and studied on the slides marked by H 18 226 and H 18 231. The specimens deriving from the collecting locality of "Scanfs 1700 m. Heide mit Wacholder + Erikas" were unequivocally identified with *Rhysotritia a. ardua*. So the otherwise synonymous name of *canestrinii* should be deleted from the fauna of Switzerland, and all these data henceforth referred to *R. a. ardua*.

#### REMARKS ON BORCARD, 1991

Borcard (1991) names five species with species names, but the identified *Phthiracarus tardus* is accompanied by cf., rendering it uncertain. With high probability we consider *Hoplophthiracarus pavidus* (Berlese, 1913) to be *H. vanderhaneni* Niedbała, 1991. The other three species listed by him (*Steganacarus herculeanus*, *S. striculus* and *Rhysotritia ardua*) are most probably correctly identified.

Concerning his 3 species of *Phthiracarus* with "open nomenclature" a correct identification is impossible without revision of the material.

## REMARKS ON MAHUNKA, 1993a, b

Concerning the 5 published species, only the abandonment of the subgenus *Archiphthiracarus* has to be mentioned. Its synonymy with *Phthiracarus* (see Niedbała, 1992) is here confirmed.

## LIST OF THE PUBLISHED SPECIES ACCEPTED FOR THE SWISS FAUNA

## Phthiracaridae

*Phthiracarus bryobius* Jacot, 1936

*Phthiracarus crenophilus* Willmann, 1951

*Phthiracarus globosus* (C. L. Koch, 1841)

## Steganacaridae

*Atropacarus striculus* (C. L. Koch, 1835)

*Atropacarus wandae* (Niedbała, 1981)

*Helvetacarus genavensis* Mahunka, 1993a

*Steganacarus herculeanus* Willmann, 1951

*Steganacarus magnus* (Nicolet, 1855)

## Oribotritiidae

*Mesotritia nuda* (Berlese, 1887)

## Euphthiracaridae

*Rhysotritia a. ardua* (C. L. Koch, 1841)

## LIST OF THE SPECIES TO BE DELETED FROM THE SWISS FAUNA

“*Phthiracarus*” *dasyurus* (Dugès, 1834)

“*Phthiracarus*” *piger* (Scopoli, 1763)

*Phthiracarus borealis* (Trägårdh, 1910)

*Phthiracarus laevigatus* (C. L. Koch, 1844)

*Calyptophthiracarus pavidus* (Berlese, 1913)

*Steganacarus clavigerus* (Berlese, 1903)

*Steganacarus spinosus* (Sellnick, 1920)

## LIST OF LOCALITIES

AG-4 = SWITZERLAND: **Argovia:** Koblenz, ramification of the river Aar, swamp; 30.IX.1967; leg. C. Besuchet — (159).

AG-5 = SWITZERLAND: **Argovia:** Densbüren, old beech stumps; 4.X.1975; leg. C. Besuchet — (160).

AP-1 = SWITZERLAND: **Appenzell:** Hoher Kasten, sifting, 1600-1700m; 18.VIII.1982; leg. C. Besuchet — (86).

AP-2 = SWITZERLAND: **Appenzell:** Säntis, 2450m; 10.VII.1967; leg. A. Comellini — (161).

AP-4 = SWITZERLAND: **Appenzell:** Schwägalp, 1400m; 26.VII.2001; leg. C. Besuchet — (196).

BE-8 = SWITZERLAND: **Berne:** Uebischisee near Thun, moss at edge of swamp; 6.VI.1996; leg. C. Besuchet — (106).

BE-9 = SWITZERLAND: **Berne:** Stockhorn, Oberstockensee, mosses at base of rocks, 1700m; 26.VII.1979; leg. C. Besuchet & I. Löbl — (165).

BL-1 = SWITZERLAND: **Basle-Land:** “Reinacher-Heide” near Reinach, Nature Reserve, xerothermic meadows, sifting, 600-700m; 12.X.1989; leg. C. Besuchet — (85).

- BL-8 = SWITZERLAND: **Basle-Land:** above Belchen/Eptingen, sifting, 1000m; 29.IX.1979; leg. C. Besuchet — (164).
- FR-4 = SWITZERLAND: **Fribourg:** Düdingen, hollow poplar at about 15 metres above ground; 27.I.1983; leg. S. Vit — (169).
- GE-1 = SWITZERLAND: **Geneva:** Allondon, Les Baillets, desiccated mosses and lichens; 19.IX.1983; leg. C. Besuchet — (58).
- GE-2 = SWITZERLAND: **Geneva:** Bois de Jussy, waterlogged mosses; 30.VI.1983; leg. C. Besuchet — (35).
- GE-3 = SWITZERLAND: **Geneva:** Frontenex, bases of oak stumps; 14.VII.1980; leg. C. Besuchet — (6).
- GE-5 = SWITZERLAND: **Geneva:** Malval, mosses and grass; 22.X.1982; leg. C. Besuchet — (31).
- GE-6 = SWITZERLAND: **Geneva:** Malval, mosses and lichens; 22.X.1982; leg. C. Besuchet — (34).
- GL-3 = SWITZERLAND: **Glarus:** Klöntal above Riedern, old tree stumps, 700m; 30.VIII.1980; leg. C. Besuchet — (1).
- GR-4 = SWITZERLAND: **the Grisons:** Felsberg near Chur, dry needles and bark from pine (*Pinus* sp.) forest; 27.IX.1983; leg. C. Besuchet — (57).
- GR-5: Switzerland: **the Grisons:** Swiss National Park, Il Fuorn, under a pile of dead branches, 1800m; 22.IX.1995; leg. C. Besuchet — (104).
- GR-6 = SWITZERLAND: **the Grisons:** Landquart, at base of alders (*Alnus* sp.); 26.IX.1983; leg. C. Besuchet — (118).
- GR-8 = SWITZERLAND: **the Grisons:** Samnaun, alpine meadows with *Rhododendron* sp., sifting, 2050m; 26.VIII.1968; leg. C. Besuchet — (26).
- GR-9 = SWITZERLAND: **the Grisons:** Santa Maria — Umbrail Pass, sifting, 2000m; 5.VIII.1974; leg. C. Besuchet — (37).
- GR-11 = SWITZERLAND: **the Grisons:** Untervaz near Chur, mosses; 29.IX.1983; leg. C. Besuchet — (126).
- GR-13 = SWITZERLAND: **the Grisons:** Val Bregaglia - Val Bondasca, dead leaves and mosses at base of alders (*Alnus* sp.), 1400 m; 19.VII.1984; leg. C. Besuchet — (59).
- GR-15 = SWITZERLAND: **the Grisons:** Umbrail Pass, 2000m; 25.VIII.1968; leg. C. Besuchet — (149).
- GR-16 = SWITZERLAND: **the Grisons:** Val Bregaglia, Soglio, hollow chestnut stumps, 900m; 10.IX.1985; leg. C. Besuchet — (146).
- GR-17 = SWITZERLAND: **the Grisons:** Val Poschiavo, above Cavajone, at base of rocks and *Rhododendron* sp., 2050-2100m; 27.VIII.1983; leg. C. Besuchet — (151).
- GR-21 = SWITZERLAND: **the Grisons:** Swiss National Park, Ova Spin, moss at spring-head, 1700m; 28.VII.1929; leg. J. Schweizer — (200).
- GR-22 = Switzerland: **the Grisons:** Swiss National Park, S-charl, decaying needles of Mountain Pine (*Pinus montana* Mill.), 2000m; 24.VII.1032; leg. J. Schweizer — (201).
- JU-3 = Switzerland: **Jura:** between Boncourt and Buix, dead leaves; 11.III.1978; leg. C. Besuchet — (174).
- JU-4 = SWITZERLAND: **Jura:** Montfaucon, mosses in old peat-bog; 5.VII.2000; leg. C. Besuchet — (206).
- LU-1 = SWITZERLAND: **Lucerne:** Eigenthal, peat-bog Forenmoos near the village of Eigenthal, *Sphagnum* sp., 970m; 2.VIII.1996; leg. C. Besuchet — (108).
- LU-2 = SWITZERLAND: **Lucerne:** above Gettnau (between Zell and Willisau), old ant-hill of *Formica rufa*; 1.VIII.1996; leg. C. Besuchet — (107).
- LU-5 = SWITZERLAND: **Lucerne:** Wohlhusen, old tree stumps; 17.III.1979; leg. C. Besuchet — (176).
- NW-3 = SWITZERLAND: **Nidwalden:** Trübsee, mosses near spring-head, 1800m; 8.IX.1997; leg. C. Besuchet — (127).

- SG-8 = SWITZERLAND: **St. Gall:** Schwendisee above Unterwasser, mosses and grass at lake-side, 1159m; 12.IX.1981; leg. C. Besuchet — (179).
- SH-1 = SWITZERLAND: **Schaffhausen:** above Hallau, mosses and dead leaves; 1983; leg. C. Besuchet — (50).
- SH-3 = SWITZERLAND: **Schaffhausen:** Bargen, dead leaves; 25.III.1978; leg. C. Besuchet — (180).
- SO-1 = SWITZERLAND: **Solothurn:** Ammansegg, mosses on floor of deciduous forest; 14.V.1972; leg. S. Mahunka & L. Mahunka-Papp — (10).
- SO-2 = SWITZERLAND: **Solothurn:** Ammansegg, litter and dry leaves in mixed forest; 14.V.1972; leg. S. Mahunka & L. Mahunka-Papp — (11).
- SO-5 = SWITZERLAND: **Solothurn:** Schnottwil, Bucheggberg, mosses on bark of a live deciduous tree; 27.IX.1987; leg. S. Mahunka & L. Mahunka-Papp — (47).
- SO-6 = SWITZERLAND: **Solothurn:** Schnottwil, Bucheggberg, dry needles in pine (*Pinus* sp.) forest; 27.IX.1987; leg. S. Mahunka & L. Mahunka-Papp — (48).
- SO-8 = SWITZERLAND: **Solothurn:** Weissenstein, dead leaves, 1250m; 6.VIII.1979; leg. C. Besuchet — (181).
- TG-3 = SWITZERLAND: **Thurgau:** Hudelmoos near Hagenwil, peat-bog with *Sphagnum* sp., 600m; 13.IX.1993; leg. C. Besuchet — (88).
- TG-7 = SWITZERLAND: **Thurgau:** Müllheim, dry leaves in mixed forest; 13.IX.1987; leg. S. Mahunka & L. Mahunka-Papp — (42).
- TG-8 = SWITZERLAND: **Thurgau:** Müllheim: rotten trunk with mosses; 13.IX.1987, leg. S. Mahunka & L. Mahunka-Papp — (43).
- TG-9 = SWITZERLAND: **Thurgau:** between Bischofszell and Hauptwil, moss on forest floor with ferns; 11.VI.1983; leg. T. & Z. Adamis — (21).
- TG-10 = SWITZERLAND: **Thurgau:** between Bischofszell and Hauptwil, moss on forest floor and dry needles in pine (*Pinus* sp.) forest; 11.VI.1983; leg. T. & Z. Adamis — (22).
- TG-12 = SWITZERLAND: **Thurgau:** between Bischofszell and Hauptwil, dry leaves and mosses on floor in beech forest; 11.VI.1983; leg. T. & Z. Adamis — (23).
- TI-3 = SWITZERLAND: **Ticino:** Bordei at base of Mount Gridone ("massif de refuge"), old chestnut stumps in forest, sifting, 700m; 24.IV.1992; leg. C. Besuchet — (90).
- TI-10 = SWITZERLAND: **Ticino:** Orselina near Locarno, leaf litter in ravine; 29.VII.1972; leg. C. Besuchet — (24).
- TI-11 = SWITZERLAND: **Ticino:** Rancate, chestnut forest, sifting; 7.IX.1965; leg. C. Besuchet — (25).
- TI-21 = SWITZERLAND: **Ticino:** Brusino-Arsizio, mosses near rivulet; 20.VII.1990; leg. C. Besuchet — (158).
- TI-22 = SWITZERLAND: **Ticino:** Cortascio above Brissago, sifting in ravine, 1050m; 22.IV.1992; leg. C. Besuchet — (157).
- TI-23 = SWITZERLAND: **Ticino:** Alpe d'Arena above Vergeletto, at base of rocks, 1700m; 22.VII.1983; leg. C. Besuchet — (142).
- TI-24 = SWITZERLAND: **Ticino:** Caprino, compost; 29.V.1982; leg. Besuchet — (154).
- TI-25 = SWITZERLAND: **Ticino:** Centovalli, Moneto, dead leaves, 800m; 23.VII.1983; leg. C. Besuchet — (144).
- TI-26 = SWITZERLAND: **Ticino:** Valle Onsernone. Spruga, mosses and humus, 1000m; 22.VII.1983; leg. C. Besuchet — (141).
- TI-28 = SWITZERLAND: **Ticino:** Rancate, horse-chestnuts; 8.VII.1963; leg. C. Besuchet — (183).
- TI-32 = SWITZERLAND: **Ticino:** Valle di Muggio, Bruzella, dead leaves; 3.VI.1969; leg. C. Besuchet — (187).
- TI-34 = SWITZERLAND: **Ticino:** Morbio Superiore, tree stump; 6.V.1969; leg. C. Besuchet (Te-69/35) — (189).

- TI-37 = SWITZERLAND: **Ticino:** Rancate, old tree stump, extraction by flotation of soil; 5.VI.1969; leg. C. Besuchet & I. Löbl (Te-69/34) — (192).
- UR-1 = SWITZERLAND: **Uri:** Klausen Pass, litter of *Rhododendron* sp., 2000m; 23.VIII.1983; leg. I. Löbl — (60).
- UR-2 = SWITZERLAND: **Uri:** above Urnerboden, dead leaves and dead grass, 1600m; 24.IX.1985; leg. C. Besuchet — (147).
- UR-3 = SWITZERLAND: **Uri:** Klausen Pass, sifting under alders, 1950m; 24.VIII.1983; leg. C. Besuchet — (150).
- UR-5 = SWITZERLAND: **Uri:** above Klausen Pass, 2000m; 12.VII.1967; leg. A. Comellini — (194).
- UR-6 = SWITZERLAND: **Uri:** Susten Pass, 2000m; 12.VII.1967; leg. A. Comellini — (195).
- VD-1b = SWITZERLAND: **Vaud:** Bonvillars, La Coudre, dead oak branch; 6.VII.1989; leg. J. Steffen — (62b).
- VD-8 = SWITZERLAND: **Vaud:** Ollon, old stump; 30.XII.1982; leg. C. Besuchet — (56).
- VD-9 = SWITZERLAND: **Vaud:** Vallorbe, source of the river Orbe, roots and soil at base of rocks; 13.V.1982; leg. C. Besuchet & I. Löbl — (81).
- VS-3 = SWITZERLAND: **Valais:** Daubensee, mosses and grass, 2200m; 11.VIII.1980; leg. C. Besuchet — (4).
- VS-4 = SWITZERLAND: **Valais:** Daubensee, mosses and grass, 2200m; 11.VIII.1980; leg. C. Besuchet — (32).
- VS-5 = SWITZERLAND: **Valais:** Fluhalp near Leukerbad, mosses and dead leaves, 2000m; 14.VIII.1980; leg. C. Besuchet — (2).
- VS-7 = SWITZERLAND: **Valais:** Finges Forest, pine (*Pinus* sp.) stumps; 13.VIII.1980; leg. C. Besuchet — (36).
- VS-12 = SWITZERLAND: **Valais:** Grand-St-Bernard, mosses on and at base of rocks, 2150m; 10.IX.1996; leg. C. Besuchet — (109).
- VS-13 = SWITZERLAND: **Valais:** La Vernaz, waterlogged mosses, 1100m; 4.VI.1985; leg. C. Besuchet — (124).
- VS-22 = SWITZERLAND: **Valais:** Simplon Pass, old cow-dung; 2030m; 23.VIII.1997; leg. C. Besuchet — (111).
- VS-28b = SWITZERLAND: **Valais:** Vouvry, cave "Grotte de la Pierre à Perret" (VS 13), 490m; 10.VIII.1989; leg. B. Hauser — (63b).
- VS-29 = SWITZERLAND: **Valais:** Randonne above Saillon, under bark, 1100-1350m; 8.XI.1982; leg. C. Besuchet — (140).
- VS-31 = SWITZERLAND: **Valais:** Val de Bagnes: Fionnay, mosses and dead leaves; 1450m; 15.V.1990; leg. C. Besuchet — (156).
- VS-32 = SWITZERLAND: **Valais:** Zermatt, Riffelberg, mosses, 2500m; 14.VIII.1969; leg. C. Besuchet — (148).
- VS-33 = SWITZERLAND: **Valais:** Evolène, mosses in swamp, 1350m; 3.IX.2001; leg. C. Besuchet — (198).
- VS-34 = SWITZERLAND: **Valais:** Monthei, outside of the cave "Grotte de Saint-Martin" (VS 1), 540m; 2.V.1980; leg. P. Strinati & V. Aellen — (199).

#### LIST OF NEWLY IDENTIFIED SPECIES

(including also the data already published by Mahunka, 1993a, b))

#### **Phthiracaridae** Perty, 1841

*Helvetacarus genavensis* Mahunka, 1993

Locality: GL-3 (Mahunka, 1993a).

Distribution: endemic to Switzerland.

*Phthiracarus baloghi* Feider & Suciu, 1957

Locality: TI-24.

Distribution: Near East, SE Europe, Romania, Hungary; **first record for Switzerland** (the westernmost finding of the species).

*Phthiracarus besuchetianus* sp. n.

Locality: JU-3. Description see below.

*Phthiracarus boresetosus* Jacot, 1930

Localities: AG-5; BL-8; GE-3; GE-5; GR-4; JU-4; SH-3; TG-3.

Distribution: Holarctic Region; **first record for Switzerland**.

*Phthiracarus bryobius* Jacot, 1930

Locality: VS-34 (Mahunka, 1993b).

Distribution: Holarctic Region.

*Phthiracarus clavatus* Parry, 1979

Localities: AP-1; GR-8; JU-4; TI-21; UR-2; VS-22; VS-31.

Distribution: Europe; **first record for Switzerland**.

*Phthiracarus compressus* Jacot, 1930

Localities: AG-4; GL-3; GR-9; JU-3; JU-4; TI-10; VS-4; VS-32.

Distribution: Holarctic Region; **first record for Switzerland**.

*Phthiracarus crenophilus* Willmann, 1951

Locality: BL-8.

Distribution: Europe.

*Phthiracarus crinitus* (C. L. Koch, 1841)

Localities: AG-4; AG-5; LU-5; SH-3; SO-1; TG-3; TG-7; TG-8; TG-9.

Distribution: Palaearctic Region, excluding the Far East; **first record for Switzerland**.

*Phthiracarus ferrugineus* (C. L. Koch, 1841)

Localities: AG-4; BE-8; SG-8; SO-8; TI-11; TI-24; TI-25.

Distribution: Europe; **first record for Switzerland**.

*Phthiracarus globosus* (C. L. Koch, 1841)

Localities: GE-2; TI-22; UR-2; UR-6; VS-13; VS-28b (Mahunka, 1993b).

Distribution: Holarctic Region.

*Phthiracarus incertus* Niedbała, 1983

Locality: SO-8.

Distribution: Holarctic Region; **first record for Switzerland**.

*Phthiracarus laevigatus* (C. L. Koch, 1844)

Localities: BL-1; GE-1; GR-4; GR-11; GR-13; GR-15; GR-16; SH-1; SO-1; TI-11; TI-28; VD-1b.

Distribution: Europe; **first record for Switzerland**.

*Phthiracarus lentulus* (C. L. Koch, 1841)

Localities: TI-22; TI-28; VS-32.

Distribution: Palaearctic Region; **first record for Switzerland**.

*Phthiracarus longulus* (C. L. Koch, 1841)

Localities: FR-4; GR-4; GR-13; LU-5; SH-1; SO-5; SO-6; TG-8; TG-12; TI-10; TI-21; TI-22; TI-25; TI-26; TI-28.

Distribution: Holarctic Region; **first record for Switzerland**.

*Phthiracarus montanus* Pérez-Íñigo, 1969

Localities: AP-1; AP-2; SO-8; TI-22; UR-1; VS-3, VS-7.

Distribution: Western Palearctic Region; **first record for Switzerland**.

*Phthiracarus nitens* (Nicolaï, 1855)

Localities: AG-4; BL-8; JU-3; JU-4; LU-5; SH-3; TG-3.

Distribution: Western Palaearctic Region.

*Phthiracarus opacus* Niedbała, 1986

Localities: BL-8; VS-5.

Distribution: Palaearctic Region; **first record for Switzerland**.

*Phthiracarus peristomaticus* Willmann, 1951

Locality: GR-13; GR-15; TI-25; TI-26; UR-2; UR-6.

Distribution: Palearctic Region; **first record for Switzerland**.

*Phthiracarus setosus* (Banks, 1885)

Locality: TI-32.

Distribution: Holarctic Region; **first record for Switzerland**.

*Phthiracarus spadix* Niedbała, 1983

Localities: AP-1; GR-8; GR-9; GR-13; GR-15; GR-17; NW-3; TI-23; UR-2; UR-3; UR-5; UR-6; VS-5; VS-22.

Distribution: Alps and Carpathian Mountains; **first record for Switzerland**.

**Steganacaridae** Niedbała, 1986*Atropacarus csiszarae* (Balogh & Mahunka, 1979)

Localities: GR-4; TI-22; TI-37.

Distribution: Europe, Caucasus; **first record for Switzerland**.

*Atropacarus striculus* (C. L. Koch, 1835)

Localities: BE-8; BE-9; FR-4; GL-3; GR-4; LU-1; LU-5; SG-8; SO-6; TG-3; TI-10; TI-11; TI-24; TI-25; TI-26; TI-28; TI-37; UR-2; VS-12; VS-22; VS-33.

Distribution: Holarctic Region

*Atropacarus wandae* (Niedbała, 1981)

Localities: AG-5; JU-3; SH-3; TI-21; VS-34 (Mahunka, 1993b).

Distribution: Europe.

*Calyptophthiracarus c. cretensis* (Mahunka, 1979)

Locality: TI-22.

Distribution: Palearctic Region; **first record for Switzerland**.

*Steganacarus (S.) antennatus* sp. n.

Localities: GR-21; GR-22. Description see below.

*Steganacarus (S.) applicatus* (Sellnick, 1920)

Localities: BL-8; GL-3; LU-1; LU-5; TG-7; TG-8; TG-9.

Distribution: WesternPalearctic Region; **first record for Switzerland**.

*Steganacarus (S.) herculeanus* Willmann, 1953

Localities: AG-5; AP-1; AP-4; BL-8; GL-3; LU-5; SO-6; SO-8; VS-4.

Distribution: Europe.

*Steganacarus (S.) hirsutus* Pérez-Íñigo, 1974

Localities: JU-4; LU-1; SO-1; SO-6; VD-9.

Distribution: Western Europe; **first record for Switzerland**.

*Steganacarus (S.) magnus* (Nicolet, 1855)

Localities: JU-3; SH-3.

Distribution: Europe.

*Steganacarus (S.) magnus* f. *anomalus* (Berlese, 1883)

Locality: SH-3.

Distribution: Palearctic Region; **first record for Switzerland**.

*Steganacarus (S.) schweizeri* sp. n.

Localities: GL-3; LU-5. Description see below.

*Steganacarus (Tropacarus) carinatus* (C. L. Koch, 1841)

Localities: GR-11; LU-1; LU-2; TG-3; TI-3; TI-10; TI-22; TI-25.

Distribution: Palearctic Region; **first record for Switzerland**.

**Oribotritiidae** Grandjean, 1954*Mesotritia nuda* Berlese, 1887

Locality: GR-5.

Distribution: Europe.

*Microtritia minima* (Berlese, 1904)

Localities: GR-16; LU-2; SH-3; TI-11; TI-22; TI-28; TI-37.

Distribution: Europe; **first record for Switzerland.**

*Protoribotritia aberrans* Märkel & Meyer, 1959

Locality: GL-3; TI-25.

Distribution: Europe; **first record for Switzerland.**

*Protoribotritia oligotricha* Märkel, 1963

Locality: GR-5.

Distribution: Sweden; **first record for Switzerland.**

*Pararititia baloghi* Moritz, 1966

Locality: TI-34.

Distribution: Central Europe; **first record for Switzerland.**

**Eupthiracaridae** Jacot, 1930*Eupthiracarus cribrarius* (Berlese, 1904)

Localities: AG-5; GL-3; GR-4; GR-13; JU-4; LU-2; LU-5; SH-3; TG-7; TI-26; VS-29.

Distribution: Europe; **first record for Switzerland.**

*Eupthiracarus monodactylus* (Willmann, 1919)

Localities: AG-4; AG-5; GE-5; GR-6; TI-11; TI-22; TI-37.

Distribution: Palearctic Region; **first record for Switzerland.**

*Rhyssotritia a. ardua* (C. L. Koch, 1841)

Localities: AG-4; BL-1; FR-4; GE-1; GE-5; GE-6; GR-4; GR-11; JU-3; SH-1; SH-3;

TG-3; TI-11; TI-24; TI-28; TI-37; VD-8; VS-4; VS-29; VS-34 (Mahunka, 1993b).

Distribution: Holarctic Region (?).

*Rhyssotritia ardua hyeroglyphica* (Berlese, 1916)

Locality: GE-6.

Distribution: Europe; **first record for Switzerland.**

*Rhyssotritia duplicata* (Grandjean, 1953)

Localities: LU-2; SO-2; TG-3; TG-9; TG-10; TI-22.

Distribution: Europe; **first record for Switzerland.**

**Mesolophoridae** Ewing, 1917*Mesolophora pulchra* Selnick, 1928

Localities: AG-4; AG-5; GE-3.

Distribution: Holarctic Region; **first record for Switzerland.**

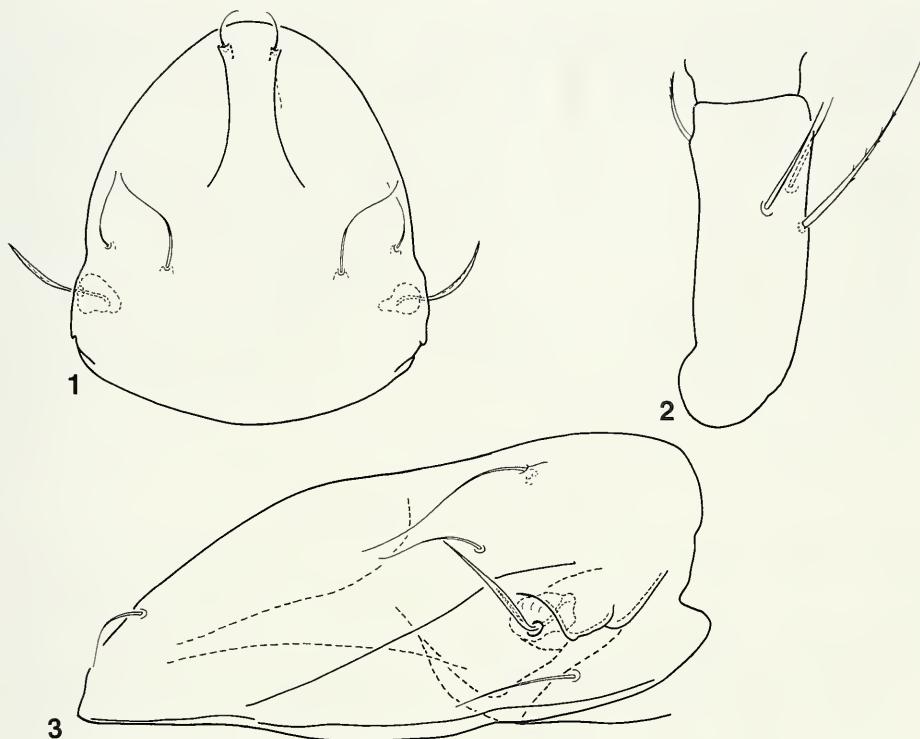
**DESCRIPTION AND DISCUSSION OF SOME SPECIES***Phthiracarus baloghi* Feider & Suciu, 1957

Figs 1-3

*Phthiracarus baloghi* Feider & Suciu, 1957: 28, figs 44-55.

*Phthiracarus baloghi*: Niedbała, 1992: 87, pl. 8A-J, 9A-I.

The Swiss specimens differ slightly from the specimens on which the redescription of Niedbała was based. The principal differences occur in the thickness of the sensillus (much longer and narrower on the Swiss specimens, see fig. 3), in the shape of the bothridial squama (significantly longer in the Swiss specimens), and, the proportion of v' and v'' setae on the femur of leg I. The species is also well charac-



FIGS 1-3

*Phthiracarus baloghi* Feider & Suciu, 1957 – 1: aspis in dorsal view, 2: femur I, 3: aspis in lateral view.

terised by the 1–3 pairs of long  $c$  setae, the great length differences of the notogastral setae, as well as the extraordinarily long exobothridial setae.

The dimensions of the Swiss specimens fall within the known range.

#### *Phthiracarus besuchetianus* sp. n.

Figs 4-7

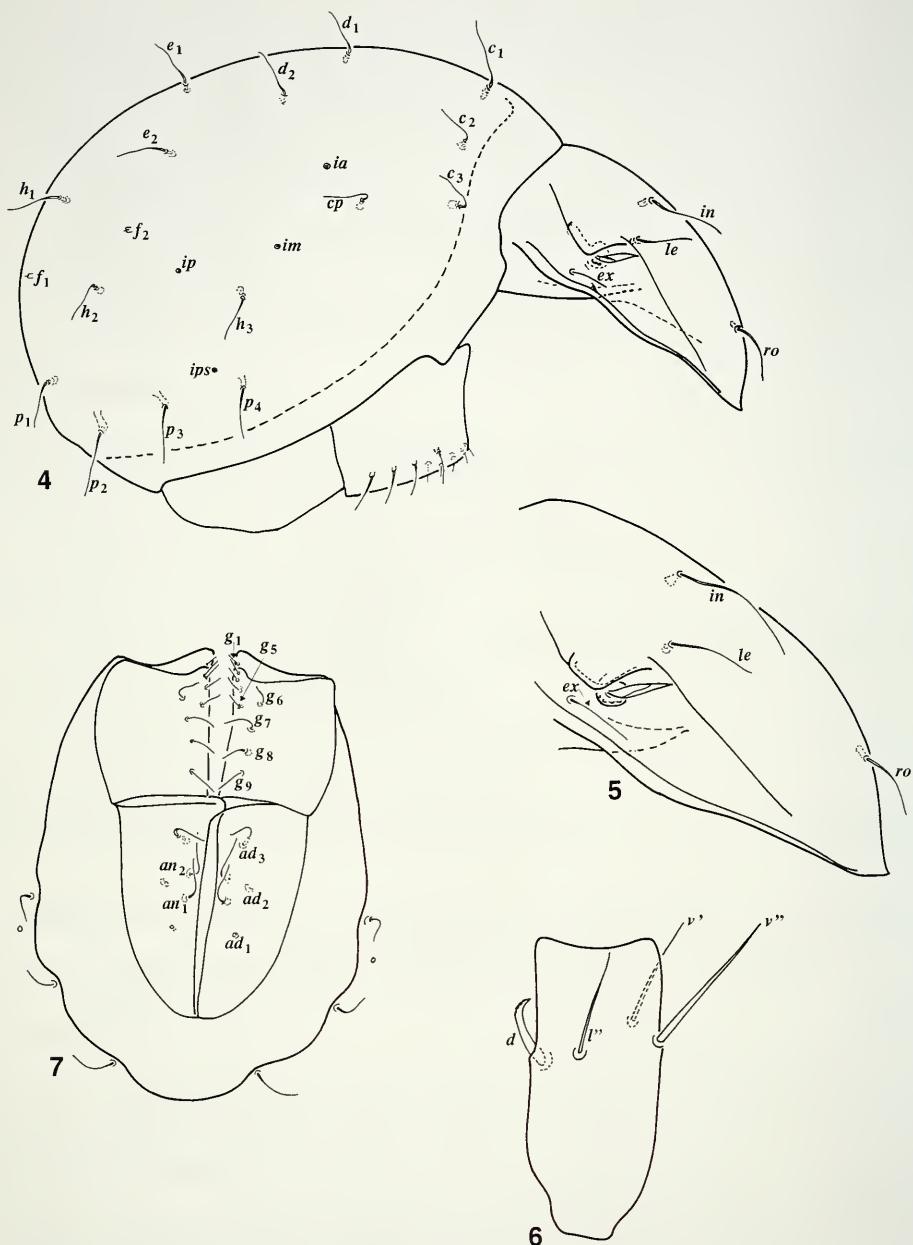
*Material examined:* Switzerland: Holotype: Jura: JU-3; 13 paratypes: from the same sample. Holotype and 8 paratypes: MHNG<sup>2</sup> and 5 paratypes (1661-P0-01): HNHM<sup>3</sup>.

*Diagnosis:* Sensillus lanceolate, short. 15 pairs of notogastral setae and four pairs of notogastral lyrifissures present. Setae  $c_1$ , located far from the collar line. The leg chetotaxy is of the “complete type”.

*Measurements:* Length of aspis: 218–340  $\mu\text{m}$ , length of notogaster: 534–608  $\mu\text{m}$ , height of notogaster: 388–454  $\mu\text{m}$ .

<sup>2</sup> MHNG: deposited in the Muséum d’histoire naturelle, Geneva.

<sup>3</sup> HNHM: deposited in the Hungarian Natural History Museum, Budapest, with identification number of the specimens in the Collection of Arachnida.



FIGS 4-7

*Phthiracarus besuchetianus* sp. n. — 4: body in lateral view, 5: aspis, 6: femur I, 7: anogenital region.

*Aspis*: Median crista absent, its outline straight basally, convex anteriorly, with a small concave part rostrally (Fig. 5). Lateral carina distinct, long, reaching over the posterobothridial squama. Lateral rim well developed, sinus line not observable. All prodorsal setae very fine, comparatively short, but setae *ex* not shorter than the rostral ones. Sensillus lanceolate, with sharply pointed distal end.

*Notogaster* (Fig. 4): All fifteen pairs of notogastral setae short, fine, filiform, somewhat flagellate at their distal ends. Among setae *c*<sub>1</sub>, *c*<sub>2</sub> and *c*<sub>3</sub>, setae *c*<sub>1</sub> arise furthest, setae *c*<sub>3</sub> nearest to the collar line. Four pairs of lyrifissures present. Vestigial setae of *f*<sub>1</sub> located far below setae *h*<sub>1</sub>.

*Anogenital region* (Fig. 7): Typical for the genus, four pairs of long setae arising in the lateral, and five pairs of short setae arising in the medial position. Five pairs of setae present on the anoanodal plates, two of which are much reduced. All short and fine.

*Legs*: The legs chaetotaxy is of the “complete type”, with setal formula:

I: 1 – 4 – 2+1 – 5+1 – 16+3 – 1.

IV: 2 – 1 – 1 – 2+1 – 10 – 1.

Setae *d* of femur I (Fig. 6) located far from the anterior margin of the segment, thick and strongly curved, serrate distal end. Seta *l'* on genu IV present.

*Remarks*: The four pairs of notogastral lyrifissures, the short and lanceolate sensillus and the position of setae *c* on the notogaster characterize the new species well. It resembles *Phthiracarus occultus* Niedbała, 1981, but, the new species has 4 pairs of lyrifissures (in *occultus* only 3), setae *c*<sub>1</sub> stand further from the collar line than in *occultus*, setae *d* on the femora arise near to the distal margin in *occultus* (far from the distal margin in the new species) and setae *l'* is absent in *occultus* (present in the new species).

*Derivatio nominis*: We dedicate the new species to Dr C. Besuchet (Geneva), the renowned coleopterist, for his collecting activity: he gathered the major part of the Swiss soil samples.

### *Phthiracarus clavatus* Parry, 1979

*Phthiracarus (Phthiracarus) clavatus* Parry, 1979: 338, figs 7a-c, pl. 3: c, f.

*Phthiracarus (Phthiracarus) clavatus*: Niedbała, 1992: 93, pl. 27: a-i, pl. 28: a-e.

It may easily be differentiated from the other species by its long notogastral setae, and the characteristically short distance of setae *c* from the collar line. The species is new for the fauna of Switzerland.

### *Phthiracarus crinitus* (C. L. Koch, 1841)

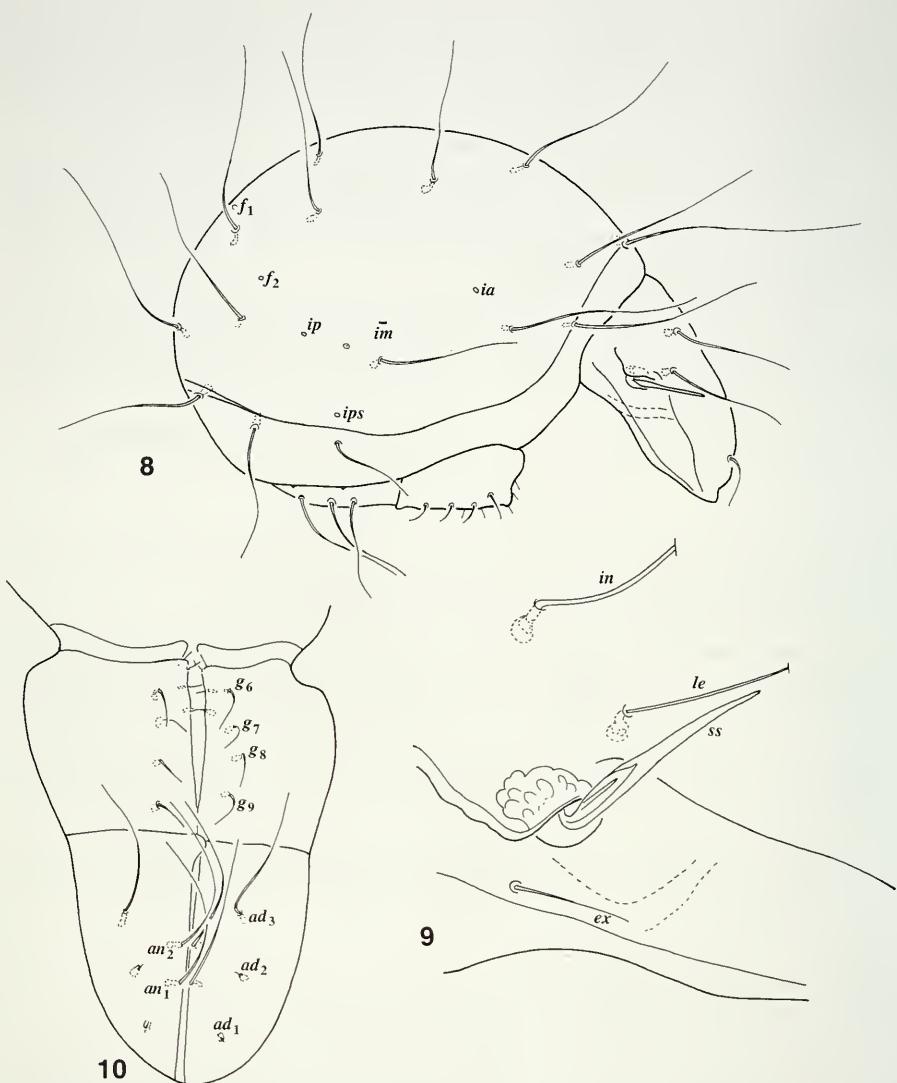
Figs 8-12

*Hoplophora crinita* C. L. Koch, 1841: f. 32, fig. 8.

*Phthiracarus crinitus*: Kamill, 1981: 263, figs 1-7.

*Phthiracarus crinitus*: Niedbała, 1992: 99, pl. 18: a-e, 21: h-l.

The species is readily identified on the basis of the works of Kamill and Niedbała. The Swiss specimens differ somewhat especially from the figure of Kamill, so we also present a figure (see Figs 8-12). The rostral part of the aspis is high, in lateral

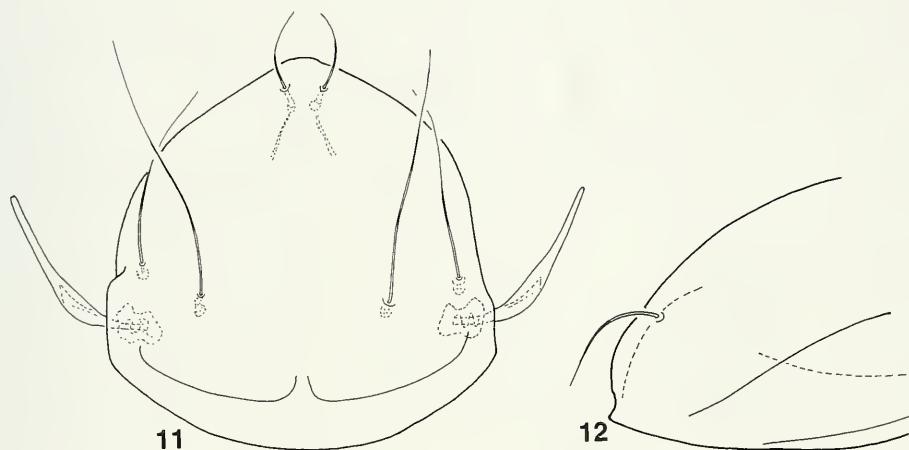


FIGS 8-10

*Phthiracarus crinitus* (C. L. Koch, 1841) – 8: body in lateral view, 9: bothridial part of the aspis, 10: anogenital region.

view almost appearing cristate. The rostrum projects forward. Seta *c<sub>2</sub>* is emitted close to the collar line on the notogaster. Lyrifissure *ip* sometimes difficult to discern, much weaker than *ips*. A characteristic feature of the species is that out of the three pairs of setae on the anogenital plate, *ad<sub>3</sub>* is not shorter than the anal setae.

The dimensions of the Swiss specimens are within the so far recorded range.



FIGS 11-12

*Phthiracarus crinitus* (C. L. Koch, 1841) – 11: aspis in dorsal view, 12: rostral part of the aspis.

#### *Phthiracarus laevigatus* (C. L. Koch, 1841)

*Hoplophora laevigata* (C. L. Koch, 1841): f. 38, fig. 16.

*Phthiracarus laevigatus*: van der Hammen, 1963: 706, figs 1-6.

*Phthiracarus laevigatus*: Niedbała, 1992: 82, pl 1: a-j.

It is one of the most common species in Switzerland. We identified the species by following the opinion and the redescription of van der Hammen, which had also been accepted by Niedbała (1992). To separate the species of *P. laevigatus* and *P. nitens* is not an easy task, further investigation is needed.

#### *Phthiracarus longulus* (C. L. Koch, 1841)

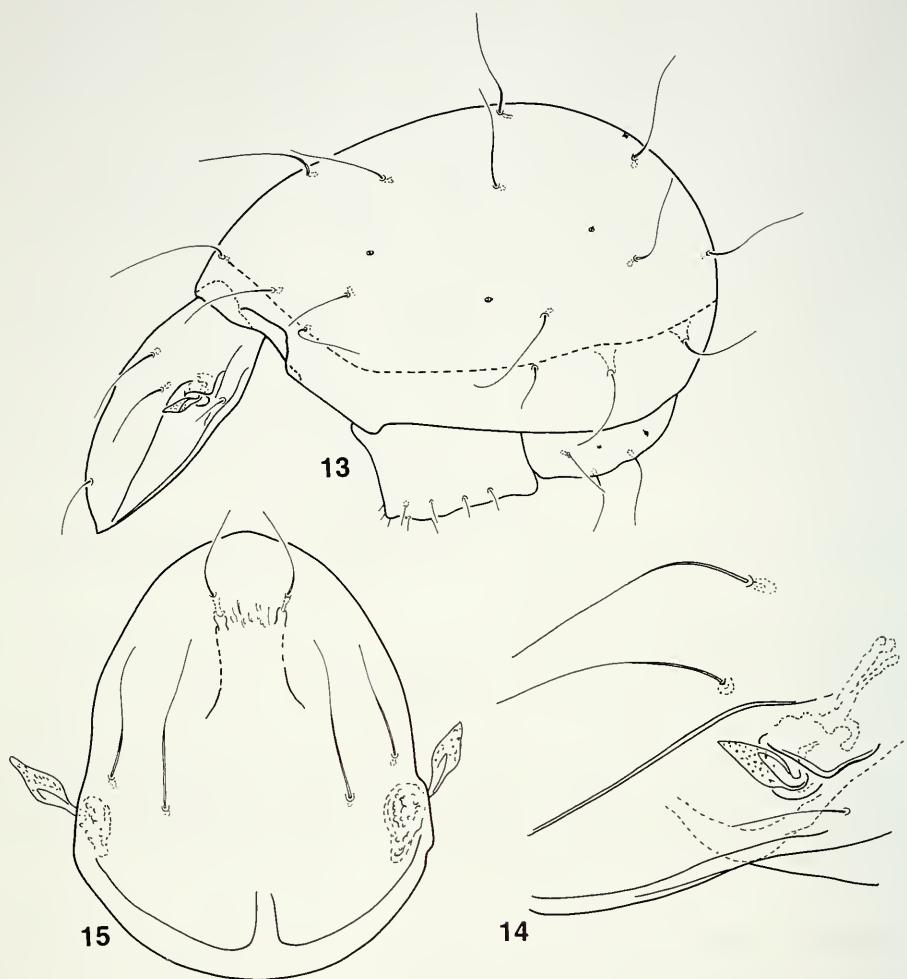
Figs 13-18

*Hoplophora longula* C. L. Koch, 1841: f. 32, fig. 17.

*Phthiracarus longulus*: Kamill, 1981: 270, figs 25-31.

*Phthiracarus longulus*: Niedbała, 1992: 116, pl. 71-76.

To identify the species is rather problematic, in spite of the redescriptions prepared by Kamill and Niedbała, due to the fact that the two redescriptions themselves and the recently collected Swiss specimens somewhat differ from one another. However, the redescriptions and the specimens confirm that the setation of the legs belong to the “reduced” type, the notogaster bears two pairs of lyrifissures, the notogastral setae are moderately long, the prodorsal carina is long, the sensillus is lanceolate and visibly spiculate. The notogaster is slightly elongate and generally light coloured. Kamill defined setae *c* as arranged in “a row immediately behind the posterior collar margin”, though she depicted them as further away. On the other hand, Niedbała placed them on the collar line, which corresponds well with the situation on the Swiss specimens. However, the latter unequivocally differ from the data of Kamill and Niedbała in the position of the vestigial *f<sub>1</sub>*, since both authors place it before *h<sub>1</sub>*; the



FIGS 13-15

*Phthiracarus longulus* (C. L. Koch, 1841) – 13: body in lateral view, 14: bothridial part of the aspis, 15: aspis in dorsal view.

Swiss specimens display it behind  $h_1$ . Another difference is the shape of seta  $d$  on the femur of leg I; on the Swiss specimens this seta is simple and setiform.

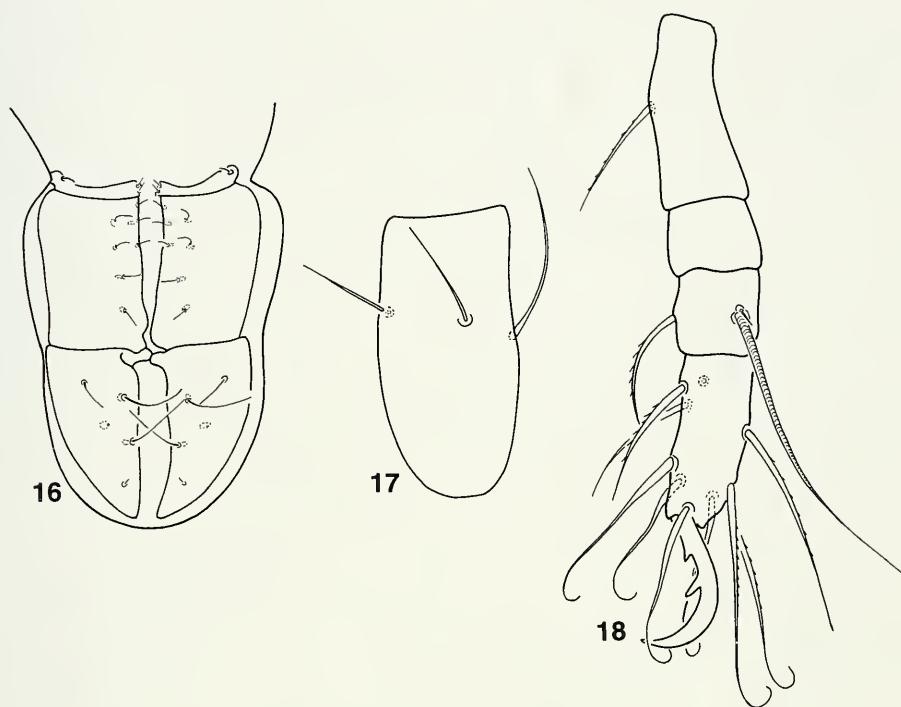
For the time being we consider these differences as intraspecific variations only.

#### *Phthiracarus opacus* Niedbała, 1986

Figs 19-22

*Phthiracarus opacus* Niedbała, 1986:

*Phthiracarus opacus*: Niedbała, 1992: 125, pl. 88: A-F.



FIGS 16-18

*Phthiracarus longulus* (C. L. Koch, 1841) – 16: anogenital region, 17: femur I, 18: leg IV.

Our experiences show that the species may be confused with *P. peristomaticus*. A significant feature is the lack of crista on the aspis. Seta  $c_2$  on *peristomaticus* is emitted somewhat further from the collar line (Fig. 19) than on *opacus*. From among the adanal setae  $ad_3$  is shorter than either the anal or the other two pairs of adanal setae. Niedbała does not mention seta  $d$  on the femur of leg I, which is located somewhere in the middle section on *opacus*, and is apically uncate (Fig. 21), while on *peristomaticus* the same is a simple, bent seta.

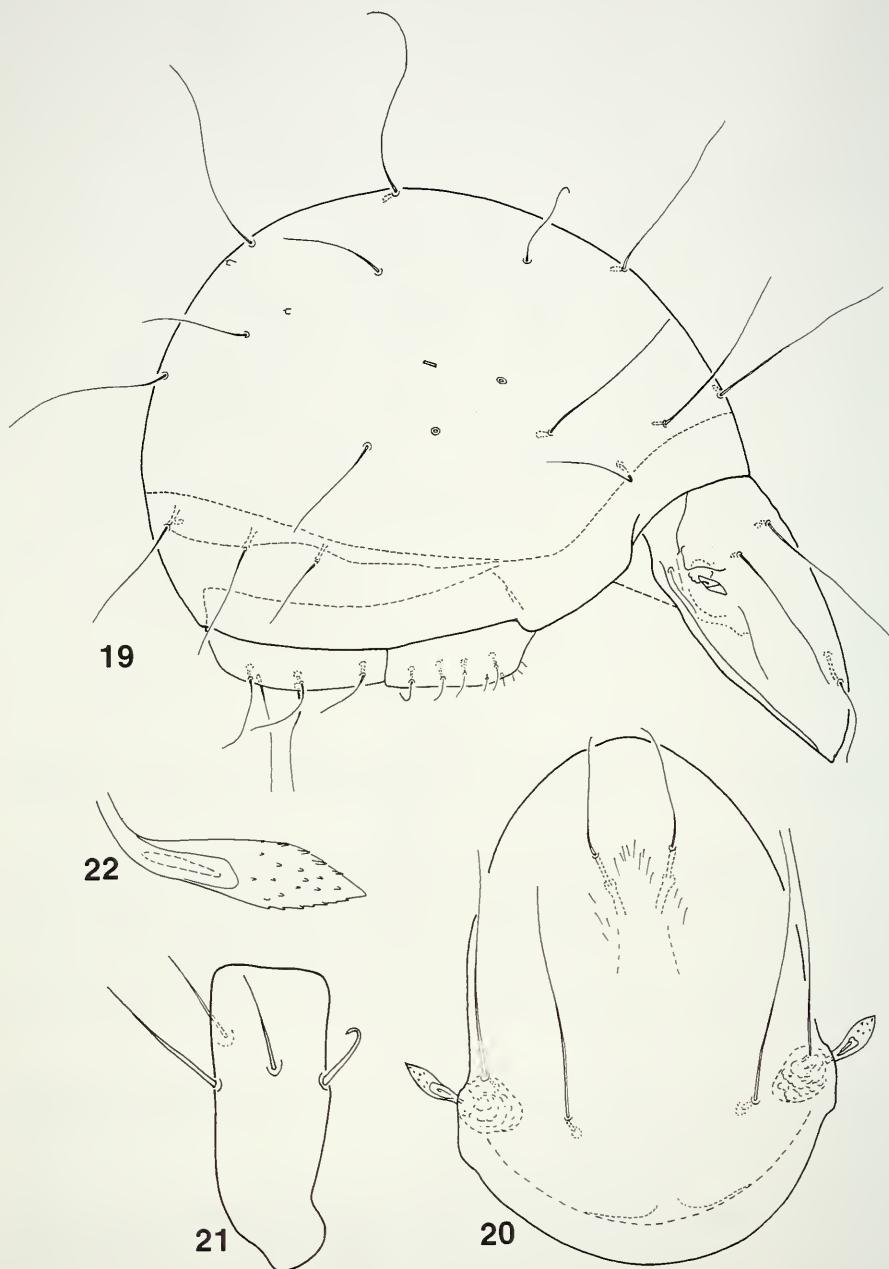
#### *Phthiracarus spadix* Niedbała, 1983

Figs 23-28

*Phthiracarus spadix* Niedbała, 1983: 143, figs 1-17.

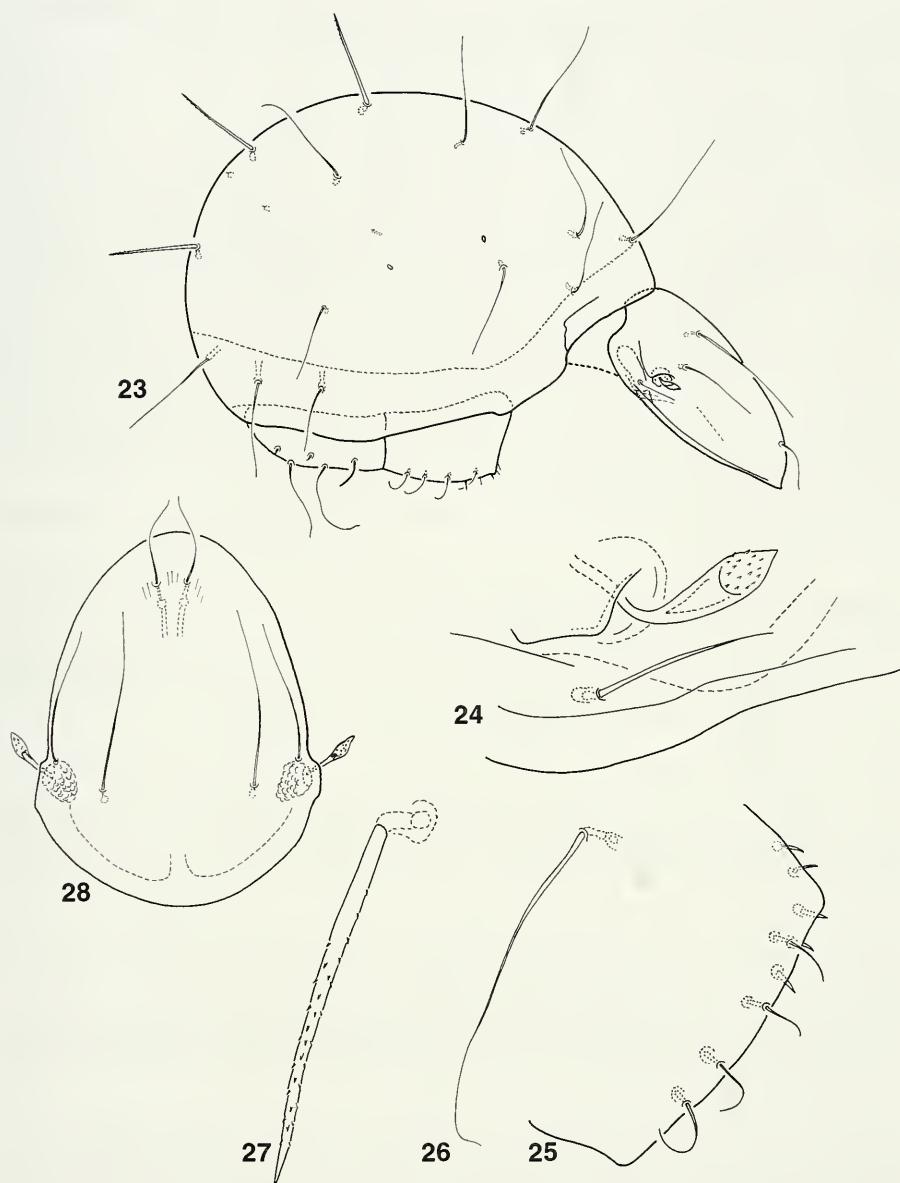
*Phthiracarus spadix*: Niedbała, 1992: 136, pl. 101: a-h.

The description of Niedbała corresponds well with the Swiss specimens. Some additional features: on the aspis the lateral keel is often hardly visible. The distal half of sensillus is ornamented with fine spicules. Setae  $h_1$  and  $e_1$  clearly bear a few short cilia or spicules. The anterior anal setae are slightly longer, strongly bending forwards and strongly attenuating. From among the genital setae  $g_6-g_9$  are strikingly long,  $g_3-g_5$  somewhat thickened. Seta  $d$  is emitted in the middle section of the femur, arcuate, finely ciliate, not reaching the anterior end of this pedal segment.



FIGS 19-22

*Phthiracarus opacus* Niedbała, 1986 – 19: body in lateral view, 20: aspis in dorsal view, 21: femur I, 22: sensillus.



FIGS 23-28

*Phthiracarus spadix* Niedbała, 1983 – 23: body in lateral view, 24: bothridial part of the aspis, 25: genital plate, 26: seta  $c_1$ , 27: seta  $h_1$ , 28: aspis in dorsal view.

The dimensions of the Swiss specimens: length of aspis: 265–317 µm, length of notogaster: 484–705 µm, height of notogaster: 386–500 µm.

*Atropacarus csiszarae* (Balogh & Mahunka, 1979)

Figs 29–33

*Steganacarus csiszarae* Balogh & Mahunka, 1979: 284, figs 7–9.

*Atropacarus csiszarae*: Niedbała, 1992: 236, pl. 255: a–i.

The species was described from Hungary, whilst Niedbała (1992) also recorded it from several central and east European countries. It has not been known hitherto from Western Europe. Subsequent to the original description Niedbała discussed the species on the basis of specimens collected in Poland. This may well be compared both to the type series and the Swiss specimens. Only slight differences may be observed in the length and thickness of the notogastral setae. In the drawing made from the Polish specimens these setae are thinner and longer than on those examined by us. Characteristic features of the species are the 19 pairs of notogastral setae, the ciliate rostral seta, the fine sensillus with an acuminate apex and distinct cilia. The position of lyrifissures *ia* and *im* is also noteworthy.

Owing to the small differences we thought it wise to provide some figures based on the Swiss specimens.

*Calyptophthiracarus c. cretensis* (Mahunka, 1979)

*Hoplophthiracarus cretensis* Mahunka, 1979: 558, figs. 27–30.

The Swiss specimens belong to the nominate subspecies. The validity of the subspecies *inopinatus* Mahunka, 1991 needs further investigation.

*Steganacarus antennatus* sp. n.

Figs 34–37

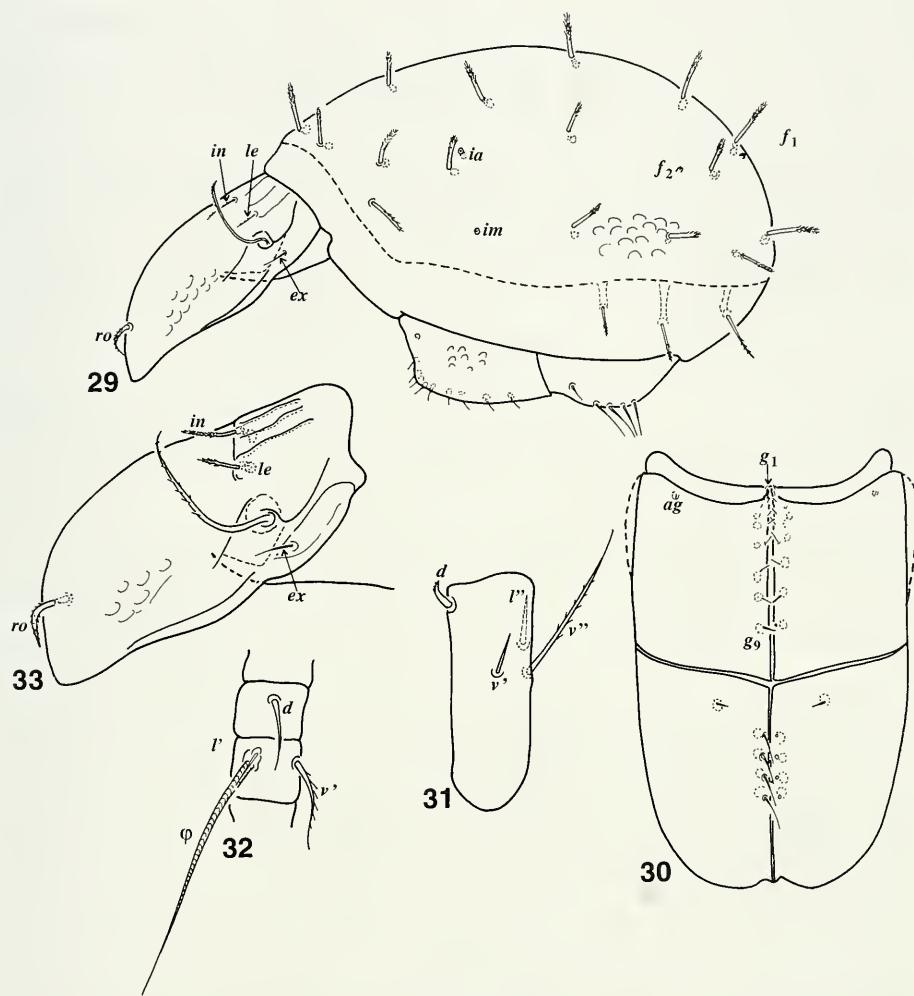
*Material examined:* Switzerland: Holotype: the Grisons: GR-21 (on slide N 708); 1 paratype: from the same sample (on slide N 668); 2 paratypes: the Grisons: GR-22 (on slide N 1819); 1 paratype: from the same sample (on slide N 1820). Holotype and the 4 paratypes: NHMB<sup>4</sup>.

*Diagnosis:* Setae of the aspis and the notogaster simple, spiniform, slightly spiculate. Sensillus very long, directed forwards, its head small, clavate. 15 pairs of notogastral setae, all equal in length. Two pairs of notogastral lyrifissures. Four pairs of anoadanal setae arising along the inner margins of the anoadanal plates.

*Measurements:* Length of aspis: 224 µm, length of notogaster: 408 µm, height of notogaster: 265 µm.

*Aspis:* Dorsal outline uniformly convex anteriorly and medially, straight basally in lateral view. Median crista and lateral carina absent. Surface ornamented by foveolae dorsally and laterally, some longitudinal rugae also observable in the basal part. Lateral surface along the margin nearly smooth. Lateral rim weakly developed, absent anteriorly. Rostral setae short, straight and erect. Lamellar and interlamellar setiform, lamellar setae twice as long as the interlamellar and rostral ones. Exobothridial setae distinct. Sensillus directed forwards, its peduncle conspicuously long, a dilated but small head well separated (Fig. 37).

<sup>4</sup> NHMB: deposited in the Naturhistorisches Museum, Basle.

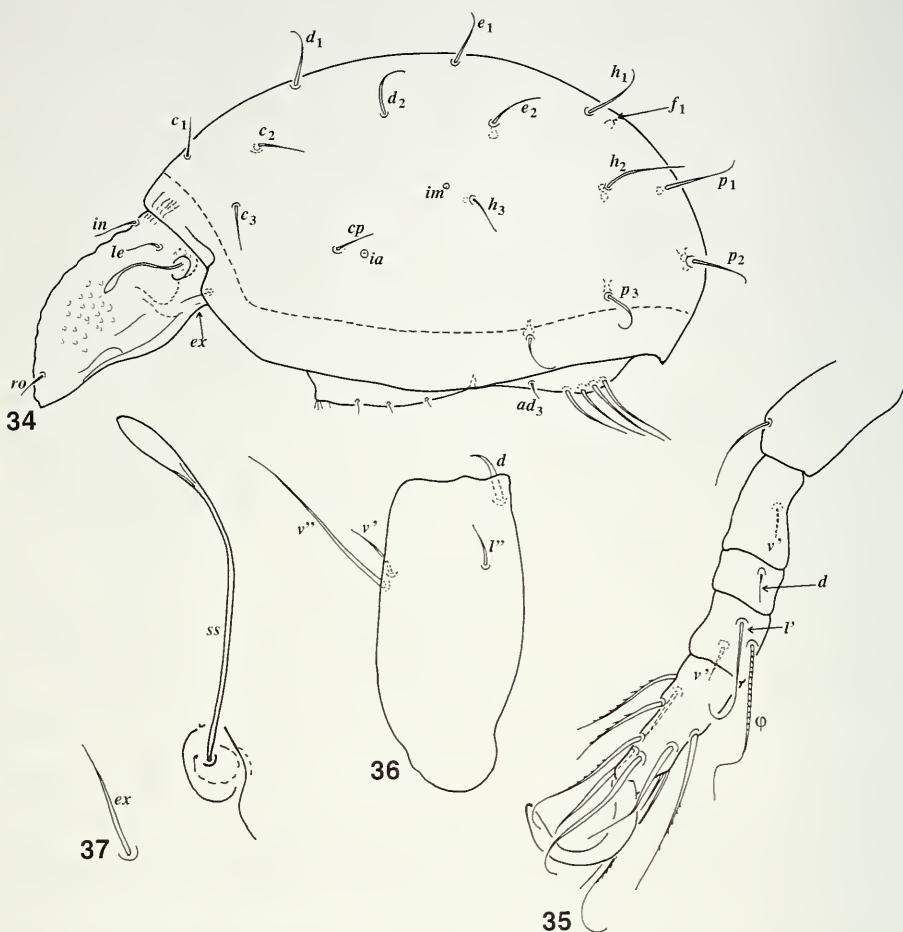


FIGS 29-33

*Atropacarus csiszarae* (Balogh & Mahunka, 1969) – 29: body in lateral view, 30: anogenital region, 31: femur I, 32: genu and tibia of leg IV, 33: aspis in lateral view.

*Notogaster* (Fig. 34): Ornamented by weak sculpture consisting of small foveolae. All 15 pairs of notogastral setae setiform, with narrowed distal end. No great differences in their lengths. Their distal part bearing small spicules. Two pairs of lyrifissures (*ia* and *im*) present, alveoli of vestigial setae clearly visible, setae *f*<sub>1</sub> arising behind setae *h*<sub>1</sub>.

*Anogenital region*: Among the anoanodal setae four pairs originate on the inner margins of the anoanodal plates, their length gradually becoming shorter anteriorly, all simple, setiform. The fifth setae (*ad*<sub>3</sub>) much shorter and simple. Nine pairs of genital setae present, all originating in longitudinal rows, but setae *g*<sub>6</sub> stand behind *g*<sub>5</sub> and *g*<sub>4</sub>.



FIGS 34-37

*Steganacarus antennatus* sp. n. – 34: body in lateral view, 35: leg IV, 36: femur of leg I, 37: bothridial region.

**Palps:** Three-segmented with the typical setal formula: 2 - 2 - 7+1.

**Legs:** The formulae of the leg setae are:

I: 1 - 4 - 2+1 - 4+2 - 16+3 - 1 (Fig. 36).

IV: 2 - 1 - 1 - 2+1 - 10 - 1 (Fig. 35).

Setae *d* on femur I short, well curved anteriorly, spiculate. Setae *v''* much longer, nearly five times longer than *v'*.

**Remarks:** On the basis of the chaetotaxy of tibia IV the new species belongs to the genus *Steganacarus* Ewing, 1917. The conspicuously long sensillus, with small clavate head, is unique in this genus.

**Derivatio nominis:** The new species is named after the remarkable length and form of its sensillus.

*Steganacarus hirsutus* Pérez-Íñigo, 1974*Steganacarus hirsutus* Pérez-Íñigo, 1974: 419.*Steganacarus hirsutus*: Bernini & Avanzati, 1986: 379, figs 1-5.*Steganacarus hirsutus*: Niedbała, 1992: 171, pl.138: d-o.

Besides giving a redescription Bernini & Avanzati (1986) discussed in detail the relationships and the distribution of the species. In 1992 Niedbała gave similarly profound analysis of the same, and established the presence of the species in France. The presently studied Swiss specimens are perfectly identifiable with the redescription of Bernini & Avanzati but stand closer to the Spanish specimens (see p. 382, fig. I) than to those from Italy (p. 383, fig. III).

The species is new to the fauna of Switzerland.

*Steganacarus schweizeri* sp.n.

Figs 38-42

*Material examined*: Switzerland: Holotype: Glarus: GL-3; 2 paratypes: from the same sample; 12 paratypes: Lucerne: LU-5. Holotype and 9 paratypes: MHNG and 6 paratypes (1662-P0-01): HNHM.

*Diagnosis*: Setae of the aspis and the notogaster spiniform. Sensillus sword-shaped, directed forwards. 15 pairs of notogastral setae, all equal in length. Four pairs of anoaddanal setae arising along the inner margin of the anoaddanal plates.

*Measurements*. - Length of aspis: 224-237 µm, length of notogaster: 408-456 µm, height of notogaster: 265-278 µm.

*Aspis*: Median crista absent. Dorsal outline weakly convex, straight dorsally in lateral view and bent downwards abruptly to rostral setae, so that it is nearly angular in lateral view. Lateral carina absent. Surface ornamented by large foveolae dorsally and laterally, 5 pairs longitudinal rugae also present in the basal part. Lateral surface along the margin nearly smooth (Fig. 39). Lateral rim weakly developed, absent anteriorly. Rostral setae short, straight and erect. Lamellar and interlamellar setae arising nearly in a transverse line, both pairs setiform, thin, lamellar setae three times longer than the interlamellar and rostral ones, nearly as long as the interlamellar setae. Exobothridial setae conspicuous. Sensillus directed forwards, conspicuously long, slightly dilated by a thin velum, nearly sword-shaped (Fig. 42).

*Notogaster* (Fig. 38): Ornamented by weak sculpture consisting of sporadic foveolae. All 15 pairs of notogastral setae setiform, with a narrow and straight distal end. No great differences in their lengths. Their distal part bearing small spicules. Two pairs of lyrifissures (*ia* and *im*) present, alveoli of vestigial setae clearly visible, of them setae *f*<sub>1</sub> arising behind setae *h*<sub>1</sub>, near to them.

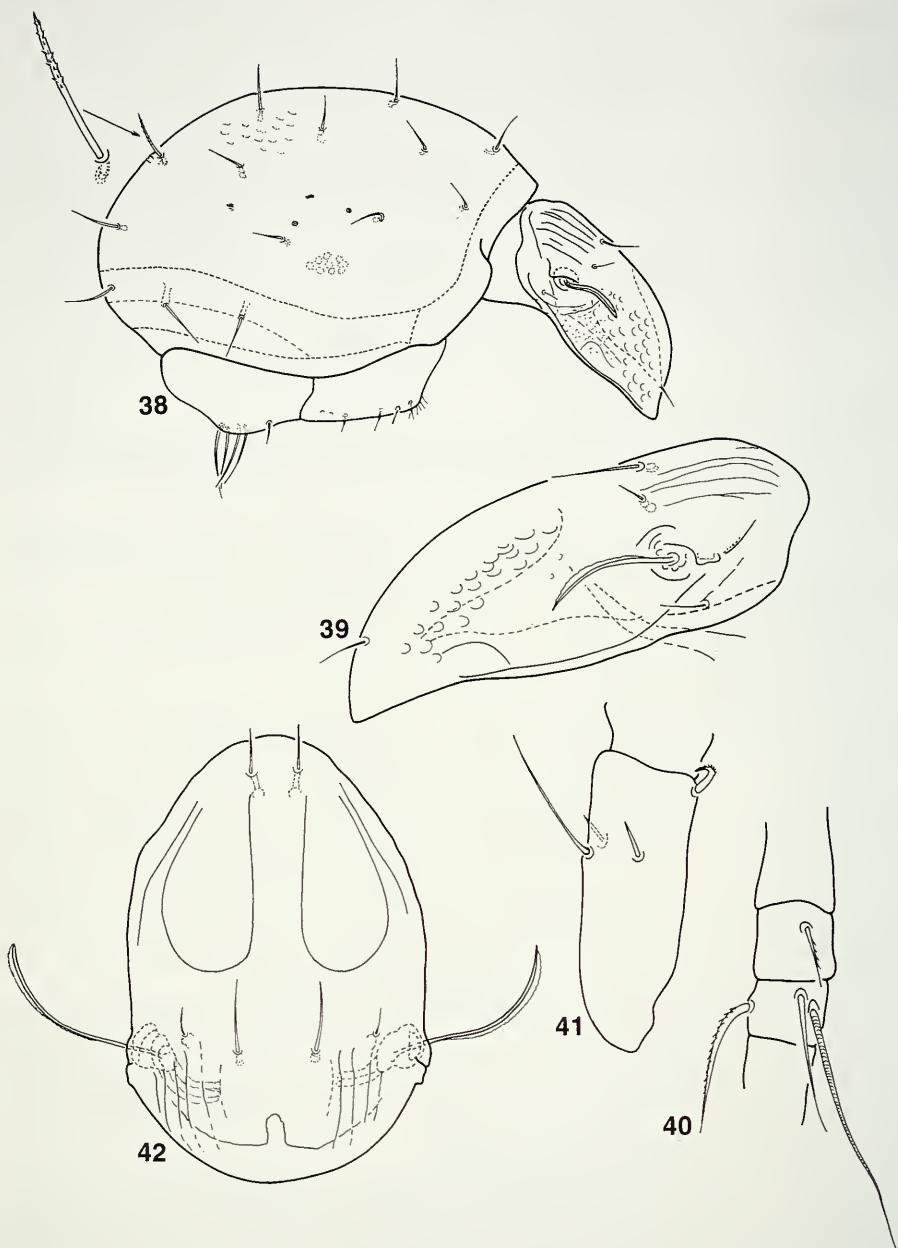
*Anogenital region*: Among the anoaddanal setae four pairs originate on the inner margin of the anoaddanal plates, their length gradually becoming shorter anteriorly, all simple, setiform. The fifth setae (*ad*<sub>3</sub>) much shorter and simple. Nine pairs of genital setae present, all originating in longitudinal rows, but setae *g*<sub>6</sub> stand behind *g*<sub>5</sub> and *g*<sub>4</sub>.

*Palps*: Three-segmented with the typical setal formula: 2 - 2 - 7+1.

*Legs*: The formulae of the leg setae are:

I: 1 - 4 - 2+1 - 4+2 - 16+3 - 1 (Fig. 41).

IV: 2 - 1 - 1 - 2+1 - 10 - 1 (Fig. 40).



FIGS 38-42

*Steganacarus schweizeri* sp. n. – 38: body in lateral view, 39: aspis in lateral view, 40: genu and tibia of leg I, 41: femur of leg IV, 42: aspis in dorsal view.

Setae *d* on femur 1 short, well curved inferiorly, spiculate. Setae *v* nearly five times longer than *v'*.

*Remarks:* On the basis of the chaetotaxy of tibia IV the new species belongs to the genus *Steganacarus* Ewing, 1917. On the basis of the long and sword-shaped sensillus and the simple notogastral setae it belongs to the “*Steganacarus coniunctus* Niedbała, 1983 — *vernaculus* Niedbała, 1982 species group”. It stands nearest to *vernaculus*, but is well distinguished from this species by the two pairs of lyrifissures (three pairs in *vernaculus*), the distance between the lamellar and interlamellar setae and the very long and narrow sensilli, which are much shorter and broader in *vernaculus*.

*Derivatio nominis:* We dedicate the new species to the memory of Prof. Dr J. Schweizer, one of the pioneer researchers of terrestrial Acari in Switzerland.

#### ***Rhysotritia a. ardua* (C. L. Koch, 1841)**

*Hoplophora ardua* C. L. Koch, 1841: f.32, fig. 15.

*Rhysotritia ardua ardua*: Pérez-Íñigo, 1974: 212, figs 27-28.

The species was recorded by Schweizer (1922, 1948, 1956) and by Borcard (1991). The former author also published it as sub *canestrinii* Berlese, 1887. It is one of the most commonly occurring ptychoid oribatids in Switzerland.

#### ***Rhysotritia ardua hyeroglyphica* (Berlese, 1916)**

*Tritia lentula* var. *hyeroglyphica* Berlese, 1916: 337.

*Rhysotritia ardua hyeroglyphica*: Mahunka, 1991: 39, fig. 15.

*Rhysotritia ardua penicillata* Pérez-Íñigo, 1969: 378, figs 4-5.

The sensillus differs from the basic form by having a clearly dilated distal end. It is much rarer than the nominate subspecies, and has never been collected simultaneously with the latter. Consequently, we consider it to be a good subspecies (see Mahunka, 1991: 39, fig. 15). The subspecies was recovered in Switzerland only at a single locality.

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